

Idiopathic Congenital Vertical Talus (CVT)

Aftab Ahmed^{1*}, GhulamMahboob², Irfanullah Ansari² and TahirMehboob²

¹Orthopedic Department, Ward 14, Jinnah Postgraduate Medical Centre, Karachi, Pakistan

²Department of Orthopedic Surgery, Jinnah Postgraduate Medical Centre, Karachi, Pakistan

*Corresponding author: Aftab Ahmed, M.D, Orthopedic Department, Ward 14, Jinnah Postgraduate Medical Centre, Karachi, Pakistan, Tel: 0092-333-3643383; E-mail: aftab42@yahoo.com

Received date: October 23, 2015; Accepted date: January 15, 2016; Published date: January 28, 2016

Copyright: © 2016 Ahmed A, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Keywords Pediatric; Severe foot deformity; Congenital vertical talus; Early treatment

Abstract

CVT is a rare, severe, important deformity. This case report is to highlight the importance of deformity and early notification. Surgical correction as one stage procedure is probably the best procedure. CVT has no sex prevalence, bilateral in 50% of cases and more than 50% of cases a secondary cause implicated. Pathological anatomy involves dislocation of the talonavicular articulation with the os calcis. Navicular bone is displaced onto the dorsolateral aspect of the talar head. Diagnostic criteria for CVT were persistent talonavicular dislocation on forced plantar flexion of foot. Talus axis and metatarsal base axis angles (TAMBA) and Calcaneal Axis and metatarsal axis (CAMBA) are introduced. TAMBA and CAMBA enable us to describe the obliquity of the talus and calcaneus, also the severity of the dislocation of the talonavicular joint and the contracture of the tendo Achilli. The current treatment is a one-stage open reduction of the talonavicular dislocation, combined with a posterior release. A subtalar bone block is often imperative to maintain correction. The surgery for (CVT) can lead complications.

Objective

The object of this presentation is to highlight the importance of this severe and important deformity and early notification at admission in a school, if ignored by a parent then the assessment in school plays a role. Surgical correction as one stage procedure is probably the best procedure. Operative correction is recommended at the end of first year of age.

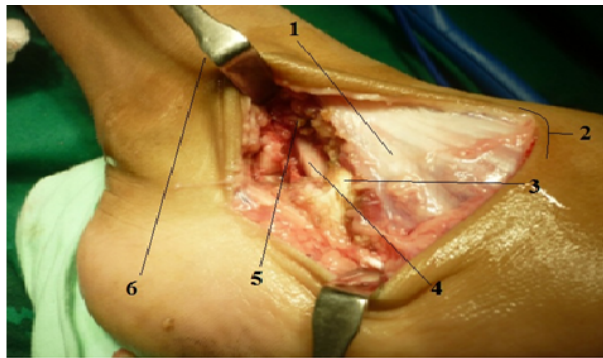
Introduction

A four and half years old boy admitted from Orthopedic OPD, for the complain of pain on walking, inability to run as compare to his elder brothers at similar ages. Parents noticed a cystic swelling at plantar aspect of foot but ignored, considered it insignificant. Physiological and radiological examination (Figure 1) confirmed an Idiopathic Congenital Vertical Talus which is not associated with any other deformity^[1].



Figure 1: CVT and a parallel line along tibia to talus

He underwent Subtalar Arthrodesis with fibular graft by Grice Green Approach by Ollierincision His ankle was immobilized for 6 weeks in a plaster cast. Follow up x-ray shows satisfactory correction of the deformity (Figures 2 and 3).



1.Ext Digitorum Brevis 2.Ollier incision; 3.Calcaneum & Cuboid; 4.Fibular Graft 5.Talus; 6.Lateral Malleolus

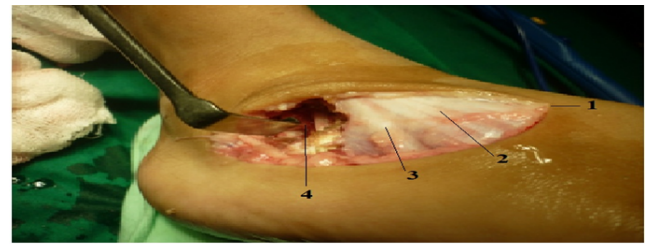
Figure 2: Bone graft from fibula in place



Figure 3: Follow up X-Ray, Fibular graft placed in subtalar area.

Discussion

Congenital Vertical Talus (congenital pes valgus, rijdrockar-bottom flat foot, congenital flat foot with talonavicular dislocation), CVT is a rare deformity of foot [1-3]. It has no sex prevalence, bilateral in 50% of cases and right foot is affected more than left, it is an isolated deformity but in more than 50 % of cases a secondary cause implicated [3,4]. Radiologically it is defined as dorsal dislocation of the navicular bone on the talus. The exact etiology of CVT remains the mystery [5,6]. It may be due to arrest in the development of foot. CVT were classified into five groups in association with (1) Neural tube defects or spinal anomalies (myelomeningocele, spina bifida), (2) neuromuscular disorders (cerebral palsy, Anterior Horn Cell Disease), (3) malformation syndromes (Freeman-Sheldon and Marfan's Syndrome), (4) chromosomal aberrations, (Down Syndrome, Trisomy 13-15) and (5) idiopathic CVT unassociated with any of the systemic conditions mentioned just above. Idiopathic CVT were sub classified into four groups: (5,A) intrauterine molded or deformed cases, (5,B) digitotalardimorphism associated with contractile finger abnormalities and genetic inheritance, (5,C) close relative had CVT or oblique talus (OT) deformity and (5,D) unassociated with any skeletal deformity or genetic inheritance [7]. This condition requires surgical correction if left untreated, it results in a painful rigid flat foot with weak push off power [8,9] (Figure 4).



1.Ollier incision; 2.Ext Digi 3.Peronei. 4. Subtalar area exposed

Figure 4: Perioperative: Exposure of Talus

Pathological anatomy involves dislocation of the talonavicular articulation with the calcaneus also rotated in plantar-flexion. The navicular bone is displaced onto the dorsolateral aspect of the talar head. The ligaments and capsule on the plantar aspect are stretched where those on the dorso lateral surfaces are contracted. The long toe extensor and peronei are also foreshortened and bowstringing occurs across the mid foot [5]. Calcaneus is in valgus and equinus with no anterior talo calcaneal articulation while talus is fixed in a vertical position with associated hypoplasia of the talar head and neck. Navicular articulates with the dorsal cortex of the talar neck. Tibionavicular and dorsal talonavicular ligaments are contracted precluding reduction of the navicular on the talus. Contracted calcaneo cuboid ligament caused forefoot abduction and posterior capsule and subtalar joint are contracted. Anterior tibial, extensor hallucis longus, extensor digitorum longus peroneal, and Achilles tendons are contracted. Clinically there is convex deformity of plantar aspect of foot. Heel is in valgus and equinus talar head can be felt on the medial plantar aspect of foot while forefoot is abducted and dorsiflexed at the midtarsal joint. Foot is fixed in this position due to the contractures of the soft tissue. Diagnostic criteria for CVT were persistent talonavicular dislocation on forced plantar flexion of OT (Oblique Talus) was diagnosed on reduction of the talonavicular dislocation on forced plantar flexion [1]. The talar and Calcaneal axis--first metatarsal base angles (TAMBA and CAMBA) are introduced [7]. Normally, longitudinal axis of first metatarsal passes plant ward to long axis of talus. In CVT long axis of first metatarsal remains dorsal to long axis of Talus. In CVT the longitudinal axis of talus is almost parallel to tibia because of the extreme plantar-flexion of talus (Figures 1 and 2) Also, this position does not change when the radiograph is taken in maximum plantar-flexion, which enables us to describe not only the obliquity of the talus and calcaneus but also the severity of the dislocation of the talo navicular joint and the contracture of the tendo Achilli. The changing point from flexible OT to rigid CVT is TAMBA of about 60degrees and CAMBA of 20 degrees. The longitudinal axis of the first metatarsal passes dorsal to the head of talus. The angular relationship between talus and first metatarsal axis has been called the TAMBA (Talus axis and metatarsal base axis) angle [3] (Figure 5).

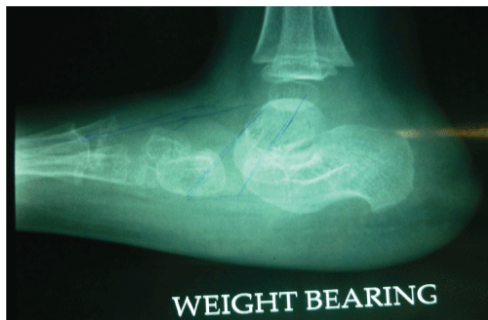


Figure 5: TAMBA and CAMBA, under stress lateral view.

In oblique view the talus is plantar flexed like in the vertical talus with foot in neutral position but on plantar-flexion radiograph the long axis of talus and long axis of first metatarsal line up, thus a fixed deformity is ruled out. Hence, it is important to take a stress plantar-flexion radiograph in every suspected case of vertical talus of foot. Standard AP and lateral radiographs, and forced plantar flexion and dorsiflexion radiographs are required to confirm the diagnosis and to assess reducibility of the deformity [3,5]. Since the navicular is unossified at birth, the relationship between the talus and navicular is delineated by drawing lines through the longitudinal axis of talus and first metatarsal. The talar and Calcaneal axis--first metatarsal base angles (TAMBA and CAMBA) are introduced [1], which enable us to describe not only the obliquity of the talus and calcaneus but also the severity of the dislocation of the talonavicular joint and the contracture of the tendo Achilli. Normally, longitudinal axis of first metatarsal passes plant ward to long axis of talus. In CVT long axis of first metatarsal remains dorsal to long axis of Talus (Figure 2). The changing point from flexible OT to rigid CVT is TAMBA of about 60 degrees and CAMBA of 20 degrees. In CVT the longitudinal axis of talus is almost parallel to tibia because of the extreme plantar-flexion of talus (Figures 1 and 2), [10,11] this position does not change when the radiograph is taken in maximum plantar-flexion. The longitudinal axis of the first metatarsal passes dorsal to the head of talus. The angular relationship between talus and first metatarsal axis has been called the TAMBA (Talus axis and metatarsal base axis) angle [3] (Figure 6):

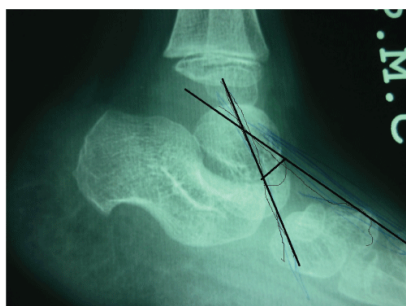


Figure 6: TAMBA & CAMBA Angles

In oblique view the talus is plantar flexed like in the vertical talus with foot in neutral position but on plantar-flexion radiograph the long axis of talus and long axis of first metatarsal line up, thus a fixed

deformity is ruled out. Hence, it is important to take a stress plantar-flexion radiograph in every suspected case of vertical talus.

Treatment

The treatment of idiopathic vertical Talus has traditionally consist of manipulation and application of casts followed by extensive soft tissue releases.

Much discussion exists about the best operative technique to treat CVT.

A number of surgical procedures have been described like soft tissue procedures include posterior capsulotomy, tendon lengthenings (EHL, EDL, AT, Peroneal and Achillis tendons) and tendon transfers (split ATT and Peroneal tendon).

Bony procedures include excision of navicular, talecomy and subtalar/triple arthrodesis. In the opinion of Bosker et al. [12] in children younger than 2 years, extensive release with lengthening of tendons and fixation procedures. In children 2 years older, extensive release with tendons transfer is the preferred procedure. When this procedure has failed, naviculectomy with extensive release and tendon transfer, or subtalar/triple arthrodesis must be considered. The widely accepted treatment of vertical talus after casting is correction by extensive surgery [9].

The goal of treatment is to reduce and maintain the anatomic relationship of the navicular and calcaneus to the talus. We recommend operative treatment for congenital vertical talus by the end of first year of age [2]. The current treatment is a one-stage open reduction of the talonavicular dislocation, combined with a posterior release. A subtalar bone block is often imperative to maintain correction [11].

Complication

The surgery for idiopathic congenital vertical talus (CVT) can lead to stiffness, wound complications and under or over correction [12].

References

1. Hamanishi C (1984) Congenital vertical talus. J Pediatr Orthop 4: 318-326.
2. Mathew PG, Sponer P, Karpas K, Shaikh HH (2009) Mid-term results of one stage surgical correction of congenital vertical talus. Bratisl Lek Listy 110: 390-393.
3. Jochymek, Skvaril JJ (2009) Surgical treatment in congenital vertical talus. Rozhl Chir 88: 32-34.
4. Jacobsen ST, Crawford AH (1983) Congenital vertical talus. J Pediatr Orthop 3: 306-310.
5. Bhaskar A (2008) Congenital vertical talus: Treatment by reverse ponseti technique. Indian J Orthop 42: 347-350.
6. Drennan JC, Sharrard WJ (1971) The pathological anatomy of convex pes Valgus. Bone Joints Surg Br 53: 455-461.
7. Supakul N, Loder RT, Karmazyn (2013) Dynamic U/S Study in the evaluation of infants with Vertical or Oblique talus deformities. Pediatr Radio 43: 376-380.
8. Alae F, Boehm S, Dobbs MB (2007) A new approach to the treatment of congenital vertical talus. J Child Orthop 1: 165-174.
9. Schwering L (2005) Surgical correction of the true vertical talus deformity. Oper Orthop Traumatol 17: 211-231.
10. Eberhardt O, Fernandez FF, Wirth T (2011) Treatment of vertical talus with the Dobbs method. Z Orthp Unfall 149: 219-224.
11. Ogata K, Schoenecker PL, Sheridan J (1979) Congenital vertical talus and its familial occurrence: an analysis of 36 patients 139: 128-132.

12. Bosker B H, Goosen JH, Castelein RM, Mostert A K (2014) Congenital Convex Pes Valgus; Congenital Vertical Talus (CVT). Bone Joint J 96-B: 274-278.